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# Loneliness in young adults with a visual impairment: Links with perceived social support in a twenty-year longitudinal study

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## ABSTRACT

**Background:** Young people with disabilities are more at risk of experiencing loneliness in later life than their typically developing peers.

**Aim:** To identify those who become lonely in later life, trajectories of perceived parent and peer support from adolescence to adulthood of young people with a visual impairment were studied.

**Methods:** A total of 316 adolescents ( $M = 18$  years;  $SD = 6.5$ ) enrolled in a cohort study in 1996; 205 of them participated in 2005, 178 in 2010, and 161 in 2016. Latent growth curve models were fitted to the data.

**Results:** Perceived parent support followed a linear decreasing course. No association was found between perceived parent support and loneliness in later life. For perceived peer support a quadratic growth pattern was found, with an increase in peer support up to age 27, and thereafter a decrease. Both the initial level and the rate of change in perceived peer support significantly predicted loneliness in adulthood.

**Conclusions:** The course of peer support is a better indicator for the risk of loneliness in later life than support from parents. Normative life transitions may affect the already vulnerable social support for young people with a visual impairment. This study highlights the importance of establishing and maintaining peer relationships throughout life.

## What this paper adds?

This study highlights the importance of social support among young people with a visual impairment. This study adds evidence on the development of social support from both parents and peers during the transition from adolescence to adulthood and describes how variations in trajectories of perceived support are related to loneliness later in life. This study is based on a unique, national, community-based longitudinal cohort study covering over 20 years, which is relatively rare in the field of visual disabilities. Never had the course of social support been charted over the course of 20 years in a community sample of people with a visual impairment. The results indicate that social support trajectories of young people with a visual impairment show a similar developmental pattern to results among typically developing youth. Low initial, and fast decreasing, peer support levels among young people with visual impairment during the transition to adulthood could be a warning sign for lower psychological wellbeing later in life. These findings facilitate a better understanding of the complex processes of becoming an adult while having a visual impairment and provide insights into the social factors that can prevent young people with a visual impairment from becoming lonely later in life. The results

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are of relevance not only for the target population of young people with visual disability, but may also be useful in studying populations with other disabilities, who might share many of the disadvantages in social and physical functioning.

## 1. Introduction

Young persons with visual impairment, on average, have smaller social networks and fewer friends, date less, and spend more time home alone compared to typically developing peers (Gold, Shaw, & Wolffe, 2010; Kef, Hox, & Habekoth, 2000). As a consequence, they are prone to lack of social support and may experience loneliness. Social support might be especially missed during the stressful transition period from adolescence to adulthood. However, little is known about the course of social support and its associations with loneliness in later life among people with a visual impairment, with existing studies limited by cross-sectional designs. The current study aimed to fill this gap by studying trajectories of social support from adolescence to young adulthood in persons with a visual impairment.

Loneliness is a subjective feeling of distress resulting from a discrepancy between desired social contact and perceived availability (Weis, 1973). While loneliness has its highest prevalence in elderly people, the integration of autonomy and relatedness in adolescence presents a window of risk and resilience for later loneliness (Luhmann & Hawkey, 2016; Qualter et al., 2015; Yang & Victor, 2011). Furthermore, experiencing loneliness and social isolation already during adolescence forebodes ill-being and health risks in later life (Caspi, Harrington, Moffitt, Milne, & Poulton, 2006). When people become socially isolated during multiple life periods there may even be cumulative effects on health outcomes. Those who are chronically lonely have a higher mortality risk (Shiovitz-Ezra & Ayalon, 2010). It is, therefore, important to understand the early roots of loneliness.

### 1.1. Perceived parent and peer support

Several studies showed that perceived social support from parents is related to self-confidence and emotional stability (Cutrona, Cole, Colangelo, Assouline, & Russell, 1994; Meadows, Brown, & Elder, 2006). A close parent-child relationship allows the child to talk about emotional problems, like feelings of insecurity and loneliness (Mounts, Valentiner, Anderson, & Boswell, 2006). Social support from parents continues to be important throughout adulthood. Those among typically developing adolescents and adults with high levels of perceived parent support were better adjusted, less distressed, and had higher wellbeing, compared with those with low levels of perceived parent support (Merz, Considine, Schulze, & Schuengel, 2009).

Support from friends is a consistent predictor of emotional, social, and overall wellbeing (Friedlander, Reid, Shupak, & Cribbie, 2007; Rueger, Malecki, Pyun, Aycock, & Coyle, 2016). Peer relationships support resilience against stress (Lee & Goldstein, 2016). Hence, peer relationships may in addition enhance psychological wellbeing (Cantone et al., 2015; Kun, Stroeken, Tintelen, & Vreeman, 2013). It is therefore not surprising that small social networks, peer rejection, and low friendship quality in adolescence are important correlates of feeling lonely (Vanhalst, Luyckx, & Goossens, 2014; Woodhouse, Dykas, & Cassidy, 2012).

From late adolescence through young adulthood, social behaviors rapidly and dramatically change (Arnett, 2000; Nelson, Leibenluft, McClure, & Pine, 2005), leading to restructuring of the social network. Important network figures such as friends, parents, and significant others take on new social roles (Bokhorst, Sumter, & Westenberg, 2010). Parental support decreases in importance during adolescence whereas support from peers increases in importance (Cheng & Chan, 2004; Helsen, Vollebergh, & Meeus, 2000; Rueger et al., 2016). Due to an increase in peer interactions from childhood to adolescence, young people focus more attention towards their social status and spend less time at home with family members. However, moving towards young adulthood, young people have been found to attach less importance to support deriving from being part of a 'crowd' and more importance to support from select peers, such as in friendships (Brown, Eicher, & Petrie, 1986). One other explanation for this change is a shift towards spending time in romantic relationships, decrease in structured time with peers after secondary education, and 'rebound' of parents as a source of support in adult life course transitions such as employment and starting a family (e.g., Guan & Fuligni, 2016). A longitudinal study conducted by Helsen et al. (2000) in 2918 typically developing Dutch adolescents confirmed that the importance of perceived peer support followed a non-linear, inverted U-shape trajectory from adolescence to adulthood, with a peak in early adulthood.

### 1.2. Social support, loneliness, and having a disability

Research among youth with disabilities has shown that transitioning into adulthood takes longer, is more complex, and more discontinuous compared to youth without disabilities (2006, Hudson, 2003; Stewart, Law, Rosenbaum, & Willms, 2002, 2014). Disabilities, such as visual impairment, affect other functions such as communication and mobility, indirectly hampering social functioning (Kef et al., 2000). Having less social support and smaller social networks makes the complex process of adult development more stressful. Berger (2012) showed that adults with a visual impairment experienced practical limitations with moving about, which diminish their opportunities to participate in social activities outside the home. Furthermore, contextual stressors such as stigmatization and victimization place substantial constraints on forming and maintaining social relationships with significant others (De Laat, Freriksen, & Vervloed, 2013; Wilson & Scior, 2014).

Comparisons between youth with visual impairment and youth without disabilities on levels of social perceived support yield mixed results. A Finnish study performed by Huurre, Komulainen, and Aro (1999) did not find differences in perceived parent support between youth with a visual impairment and sighted peers. Kef (2002) studied 316 Dutch youth, aged 14–24 years, who were blind or low-sighted and found that they scored lower on perceived support of most network figures, except peers, compared to youth without

disabilities. In 2004, Kef et al. ran the analysis in the same sample but with only the young adolescents ( $N = 178$ ; aged 14–18) and again found this difference between youth with and without disabilities, and this time also for perceived social support from peers. This study also showed higher perceived support levels from parents compared to peers (Kef & Dekovic, 2004). Furthermore, perceived peer support was more predictive of psychological wellbeing than parental support. Studies among adults with a visual impairment also showed that higher levels of perceived and received social support were related to better psychological wellbeing (Cimarolli & Boerner, 2005; Guerette & Smedema, 2011). However, little is known about the way perceived social support changes over time and how that helps to explain why some people feel lonely.

To our knowledge, only one study used a longitudinal design, with a 2-year interval, to study social support of young people with a visual impairment (Pinquart & Pfeiffer, 2013). In this study, change in social support scores of 182 German students with a visual disability ( $M$  age = 15.64;  $SD = 2.1$ ) was modelled. All students with a visual impairment in this study attended segregated residential schools and only a small proportion (19%) lived with their parents. The results showed an average decline of both parent and peer support over time. When comparing the levels of social support of the students with a visual impairment to 556 sighted peers ( $M = 14.19$  years;  $SD = 1.8$ ) only a small difference was found for the initial levels of perceived parent support and this effect disappeared when controlling for habitat (students with a visual impairment did significantly live less often with their parents than sighted peers). Perceived parent and peer support changed over time in similar fashion for the two groups (Pinquart & Pfeiffer, 2013). While reassuring at least for the adolescent period, these results do not provide insight into potential disadvantages across the transition to adulthood.

Youth with disabilities are more at risk of experiencing loneliness than are typically developing children (Bauminger & Kasari, 2000; Boer, Pijl, Post, & Minnaert, 2013; Gilmore & Cuskelly, 2014). Because most studies on loneliness in populations with a visual impairment are done among elderly people, little is known about loneliness in young people with visual impairment. One cross-sectional study by Kef (2002) found no differences between levels of loneliness of young people (aged 14–24) with a visual impairment and sighted youth. In contrast, Huurre and Aro (1998) found higher loneliness among visually impaired adolescents (14–16 years) than typically developing adolescents. These mixed findings among young people with a visual impairment underscore the importance of continuing research to explore the nature of loneliness among people with a visual impairment also in adulthood.

### 1.3. The current study

The purpose of this study was to examine the course of perceived parent and peer support among young people with visual impairment over a period of twenty years, from adolescence to young adulthood, and to investigate how these individual trajectories in support are related with loneliness in later life. Based on prior research on the development of social support during the transition into adulthood we propose the following. First, we expect to find a decreasing linear trajectory of change for parent support over time (**Hypothesis 1**). Second, we expect a curvilinear trajectory of change for peer support over time, starting with an increase from adolescence into early adulthood and later a decrease when progressing into adulthood (**Hypothesis 2**). Last, our third hypothesis is that both initial levels and the trajectories of change of perceived social support from parents and peers predict loneliness in later life (**Hypothesis 3**).

## 2. Methods

### 2.1. Procedure and sample

Four measurement waves (1996, 2005, 2010, and 2016) were conducted in a longitudinal multicenter cohort study of people with VI. In 1996, participants were recruited within schools and through Dutch national rehabilitation centers in cooperation with a federation of parents of children with VI. Eligibility requirements for rehabilitation care in The Netherlands follow the criteria of the World Health Organisation (WHO). The population included in the study were adolescents living in The Netherlands who are blind or low-sighted, aged between 14 and 24 years old with no additional impairments (such as cognitive or hearing impairments). In 1996, participants were contacted by letter and provided informed consent before entering the study. At the first and second measurement trained interviewers visited the home of the participants and used Computer Assisted Personal Interviewing (CAPI) to collect the data. In the third and fourth measurement waves the participants were interviewed by trained interviewers using Computer Assisted Telephone Interviews (CATI). Both computer-assisted data collection methods (CAPI and CATI) minimized missing data within questionnaires (De Leeuw, Hox, & Kef, 2003). Before every measurement all participants received an information letter with a brief description of the aims and main topics of the study. No incentives were provided for participation. The study protocol had been approved by the ethical review board for the Faculty of Behavioural and Movement Sciences of the Vrije Universiteit Amsterdam (VCWE.1310.010).

Within a twenty-year timeframe, participants were interviewed in 1996 (T1;  $N = 316$ ;  $M$  age 18;  $SD = 2.8$ ), 2005 (T2;  $N = 205$ ;  $M$  age 27;  $SD = 2.8$ ), 2010 (T3;  $N = 178$ ;  $M$  age 32;  $SD = 2.8$ ), and 2016 (T4;  $N = 161$ ;  $M$  age 39;  $SD = 2.7$ ). 18 participants, who dropped out between 1996 and 2005, re-entered the study in 2010 and 15 of them also participated in 2016. A total of 27 participants dropped-out between 2005 and 2010, with two re-entering the study in 2016. The sample at the first measurement in 1996 consisted of adolescents living in either the community (91%) or in institutions (9%). Of the total group in 1996, 19% was blind, 18% had severe low vision, and 63% low vision. There was an almost equal gender distribution (T1 52.5% male) in 1996 and the follow-up measurements (T2 57% male; T3 55% male; T4 56% male). At T4, 67% of the 161 participants were involved in a romantic relationship. At T1, 86% of the participants indicated they were of Dutch origin.

## 2.2. Measures

### 2.2.1. Perceived social support

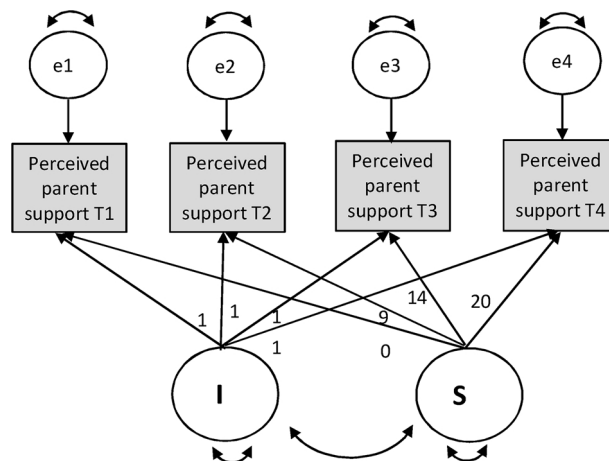
Perceived social support was assessed with the Personal Network List (PNL), using the role-relation method (Meeus, 1994). This 3-item questionnaire measures the importance of members of the social network (e.g., father, mother, best friends, friends, important classmates or colleagues) helping to solve problems in three different domains: relational/emotional problems, school/work problems, and leisure time. Examples of the items assessing are “If you encounter a problem in the relationship with someone else or when you feel lonely, who helps you?” (relational/emotional support); “If you encounter a problem in school or at work, who helps you?” (Practical support); and “Which persons are important in your leisure time? With whom can you have a good time? To which person do you turn to if you don’t know what to do in your leisure time?” (Social companionship). Response options for each social network member for the three domains ranged from 10 ‘this person is not important’ to 100 ‘this person is very important’. In this study on every time point the highest score of father or mother was taken on all three domains and summed across domains to one overall perceived parent support score. To measure perceived peer support, the highest scores of best friends, other friends, and important colleague/classmate was used for all three domains and then summed across domains to one score for peer support at every time point. The total summed scores varied between 30 and 300 for both perceived parent and peer support. The internal consistency for the three domains of perceived parent support on the four measurement points ranged from  $\alpha = .72$  to  $.82$  and for perceived peer support from  $\alpha = .73$  to  $.81$ .

### 2.2.2. Loneliness

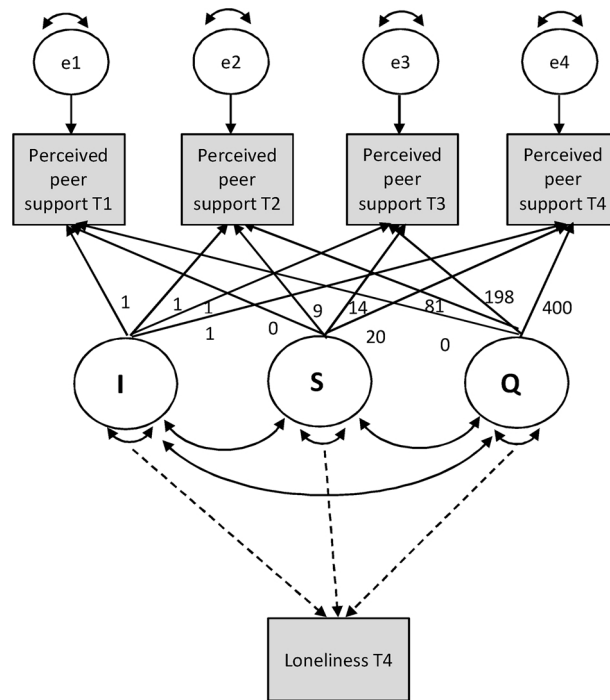
The 11-item loneliness scale of De Jong Gierveld (De Jong Gierveld & Tilburg, 1999) was administered. Questions were answered on a three point Likert scale (0 = yes, 1 = more or less, and 2 = no). The questionnaire consists of both positive items, measuring feelings of belongingness, and negative items, applying to the aspect of missing relationships. Following the scoring instructions, responses were dichotomized by scoring the response ‘more or less’ as either ‘yes’ or ‘no’ depending on the direction of the statement (negative or positive). A ‘more or less’ answer is deemed an indicator of loneliness because people are reluctant to admit to items describing deficits in social relationships due to stigma. After dichotomizing the responses, a total score was computed by summing all answers on the 11 items so that total score ranged between 0 and 11. A minimum score of zero can be interpreted as complete absence of loneliness, a score of 3.0 or higher as a state of loneliness, and the maximum score of 11 refers to absence of any social embeddedness (De Jong Gierveld & Tilburg, 1999). In the current sample, the internal consistency of the total scale measured at T4 in 2016 was good (0.91).

## 2.3. Statistical analyses

To model the individual differences in growth of social support we used latent growth curve modeling in Mplus, with Full Information Maximum Likelihood Robust (MLR) as the estimator. A latent growth model describes an individual growth curve for each subject. For perceived parent as well as peer support, we chose a statistical model that corresponded with the hypothesized pattern of growth (linear or quadratic). Based on our first hypothesis, we used a linear growth model for perceived parent support (Fig. 1). This model contains two factors. The first factor was the intercept (I) describing the initial level (T1, 1996) of perceived parent support. The second factor was the linear slope (S), describing the linear rate of change in the true levels of perceived parent



**Fig. 1.** Linear latent growth model of perceived parent support. I is the intercept and represents the average initial levels of perceived parent support at T1 in 1996. S is the slope and indicates the linear change of perceived parent support over time. The intercept (I) is specified by setting its factor loadings at 1. The factor loadings of the linear slope (S) are fixed to the values reflecting the spacing of assessment over time; 9 years between T1 and T2, 14 years between T1 and T3, and 20 years between T1 and T4. e1, e2, e3, and e4 represent the residual variances of the four measurement points.



**Fig. 2.** Curvilinear latent growth model of peer support. I is the intercept and represents the average initial levels of perceived peer support at T1 in 1996. S and the Q are the slope and the quadratic factor and indicate together the nonlinear change of perceived peer support over time. The intercept (I) is specified by setting its factor loadings at 1. The factor loading of the linear slope (s) are fixed to the values reflecting the spacing of assessment over time; 9 years between T1 and T2, 14 years between T1 and T3, and 20 years between T1 and T4. The factor loadings of the quadratic factor (Q) were fixed at the quadratic values of the linear slope; 81, 198, and 400. e1, e2, e3, and e4 represent the residual variances of the four measurement points.

support from T1 to T4, with positive values meaning an increase of support and a negative value a decrease of support in time. The intercept was specified by setting its factor loadings to 1. The first factor loading of the linear slope was fixed to 0, and the second to fourth factor loadings were fixed to values reflecting the number of years between assessments: respectively, 9 years between the first (1996) and the second (2005) measurement, 14 years between the third (2010) and the first measurement, and 20 years between the fourth (2016) and the first measurement. In the linear growth model for perceived parent support, 9 parameters were estimated freely: the mean and variance of both intercept and slope (4 parameters), the covariance between intercept and slope (1 parameter), and the residual variances of the parent perceived support variables at the four measurements; T1, T2, T2, and T4 (4 parameters).

Based on our second hypothesis, we used a quadratic growth model for perceived peer support (Fig. 2). This model contained three factors. The first two factors were the intercept and linear slope, for which the same fixed values of the factor loadings were used as in the perceived parental support model. The third factor was the quadratic slope (Q), which described the possible curvilinear development of perceived peer support. The quadratic slope factor loadings were fixed to the quadratic values of the linear slope factor loadings; 0, 81, 198, and 400. In the quadratic growth model for perceived peer support, 13 parameters were estimated freely: the means and variances of the intercept, linear slope, and quadratic slope (6 parameters), the covariances between intercept and slope factors (3 parameters), and the residual variances of the perceived peer support variables at the four measurement points; T1, T2, T3, and T4 (4 parameters).

Overall goodness of fit of the models was evaluated with four widely used model fit indices (Kline, 2011): Root Mean Square Error of Approximation (RMSEA, with  $.05 < \text{RMSEA} < .08$  = acceptable fit;  $\text{RMSEA} < .05$  = good fit), Tucker-Lewis index ( $\text{TLI} > .90$  = acceptable;  $> .95$  = good), Comparative Fit Index ( $\text{CFI} > .90$  = acceptable;  $> .95$  = good), and the Standardized Root Mean Square Residual ( $\text{SRMR} < .08$ ). Because the  $\chi^2$  test statistic is thought to be more heavily influenced by the sample size, we did not use the  $\chi^2$  to evaluate the model but reported it for completeness. Based on these fit indices, the model fit was checked and used to decide if the model fitted the data.

After a good fitting model was established, the variable loneliness was added to the model, with the I, S, and Q factors predicting loneliness. The aim of these analyses was to test for the relationship between initial levels and the trajectories of change over time in perceived parent and peer support with loneliness in later life (T4).



**Table 1**

Inter-correlations, means, and standard deviations of perceived parent and peer support.

	Perceived parent support				Perceived peer support			
	1996	2005	2010	2016	1996	2005	2010	2016
T1 (1996)	1.00				1.00			
T2 (2005)	0.32**	1.00			0.42**	1.00		
T3 (2010)	0.35**	0.53**	1.00		0.27**	0.42**	1.00	
T4 (2016)	0.38**	0.46**	0.58**	1.00	0.28**	0.53**	0.44**	1.00
T4 Loneliness	-0.13	-0.08	-0.04	0.08	-0.16*	-0.29**	-0.20*	-0.33**
N	316	200	167	154	316	201	173	157
M	217.04	197.53	201.19	175.38	226.66	230.38	223.42	215.67
SD	57.19	61.01	52.08	73.18	50.04	49.04	52.08	50.14

Note. N = Number, M = Mean, SD = Standard Deviation.

\* correlations are significant at  $p < 0.05$ .\*\* correlations are significant at  $p < 0.001$ .

### 3. Results

#### 3.1. Preliminary analyses

Preliminary analyses were conducted to examine distribution properties and to screen for potential outliers. Table 1 contains the inter-correlations, means, and standard deviations of measures for perceived parent and peer support. Distributions for perceived parent and peer support were somewhat negatively skewed, with skewness ranging from -1.24 ( $SE = 0.17$ ) to -.48 ( $SE = 0.17$ ). A majority of the participants had high scores on perceived parent and peer support on all four time-points; mean score for perceived parent support ranged between 175 and 217 and for perceived peer support between 216 and 230 (scores could range between 30 and 300). For loneliness a mean score of 2.7 ( $SD = 3.11$ ) was found (on a range from 0 to 11). Loneliness was positively skewed, with skewness of 1.30 ( $SE = 0.19$ ), which shows that most of the participants had a rather low score on this variable. Yet, thirty-five percent of the participants had a score of 3.0 or higher, indicating a state of loneliness. For handling the bias in results introduced as a result of these deviations from normality, we used a maximum likelihood estimator with robust standard errors with a numerical integration algorithm (MLR).

The mean of perceived peer support was significantly higher than the mean of perceived parent support; T1 ( $t = 67.47, p < .001$ , paired t-test); T2 ( $t = 45.75, p < .001$ , paired t-test); T3 ( $t = 42.09, p < .001$ , paired t-test); T4 ( $t = 29.22, p < .001$ , paired t-test). The results from a comparison of levels of perceived peer support in T1 between participants who also completed the measurement at T2 and participants with incomplete data at T2 showed no significant difference between the groups (complete data:  $M = 223.93, SD = 50.67, n = 201$ ; incomplete data:  $M = 231.43, SD = 48.77, n = 115$ ;  $t = 1.28, p = .20$ , paired t-test). The same analyses were conducted for subsequent waves for perceived peer and parent support and no significant differences were found ( $p > .05$ , paired t-test).

As shown in Table 1, the inter-correlations among the four measurements of perceived parent support and perceived peer support scores were statistically significant, ranging from moderate to large in size (0.27 - 0.58). With regard to loneliness, only the correlations with perceived peer support were statistically significant (ranging from -0.16 to -0.33). No significant associations were found between perceived parent support and loneliness.

#### 3.2. Growth curves of parent and peer support (Hypotheses 1 and 2)

Fit indices suggested an acceptable (based on RMSEA) to good model fit (based on CFI, TLI and SMRS) for a linear latent growth curve model for perceived parent support (Hypothesis 1):  $\chi^2 = 9.97, p = .07$ ; RMSEA = 0.056, CFI = 0.96, TLI = 0.95, SRMR = 0.050. The estimated mean values of the intercept and the linear slope were  $I = 217.53$  ( $SE = 3.02, p < .001$ ) and  $S = -1.80$  ( $SE = 0.27, p < 0.001$ ). The intercept represents the average initial level of perceived parent support at T1 in 1996 and the linear slope indicates the average decrease in levels of perceived parent support over time. Significant variance of the intercept and linear slope (variance  $I = 772.20, SE = 206.24, p < .001$  and variance  $S = 1.86, SE = 0.83, p = .024$ ) was also found, indicating individual differences in perceived parent support at T1 in 1996 as well as individual differences in the rate of change in perceived parent support over time. The correlation between intercept and slope was estimated at 0.99 ( $SE = 0.06, p < .001$ ). This indicates that adolescents who started with high levels of perceived parent support at T1 decreased less in this perceived support than did adolescents who started with lower levels of perceived support.

With regard to perceived peer support, the fit indices suggest an excellent model fit for a quadratic latent growth curve model (Hypothesis 2):  $\chi^2 = 2.17$  ( $df = 4$ ),  $p = 0.54$ ; RMSEA = 0.000, CFI = 1.000, TLI = 1.018, SRMR = 0.058. The estimated mean values of the intercept, the linear slope, and the quadratic slope were  $I = 226.78$  ( $SE = 2.814, p < .001$ ),  $S = 0.97$  ( $SE = 0.58, p = .09$ ), and  $Q = -0.08$  ( $SE = 0.03, p = .007$ ). The intercept represents the average initial level of perceived peer support at T1 in 1996 and the linear and quadratic slope together indicate the average nonlinear change in perceived peer support over time. The model

shows that perceived peer support first increased between T1 ( $M = 19$  years) to T2 ( $M = 27$  years) and decreased after T2 until T4 ( $M = 39$  years). Significant variances of the intercept and linear slope (variance  $I = 1172.69$ ,  $SE = 232.23$ ,  $p < .001$  and variance  $S = 3.14$ ,  $SE = 1.58$ ,  $p = .047$ ) were obtained, indicating significant individual differences in perceived peer support at T1 in 1996 and in the rate of change in perceived peer support over time. The variance of  $Q$  was close to zero and non-significant, leading to estimation problems in the estimates of the correlations of  $Q$  with  $I$  and  $S$ . Therefore, we constrained the variance of  $Q$  to zero. The correlation between intercept and slope was not significant and estimated at  $-0.33$  ( $p = .14$ ). This indicates that adolescents who started with higher or lower levels of perceived peer support at T1 did not differ in how strongly their perceived peer support increased between T1 and T2 and decreased between T2 and T4.

### 3.3. Predicting loneliness (Hypothesis 3)

Because no significant associations were found between perceived parent support at any measurement wave and loneliness at T4, loneliness was not added to the perceived parent support model.

To test hypothesis 3, the variable loneliness was added to the quadratic latent growth model for perceived peer support. Because the variance of  $Q$  was constrained to zero, we did not predict loneliness from  $Q$ . Model fit was excellent:  $\chi^2 = 3.45$ ,  $p = .75$ ; RMSEA  $< 0.001$ , CFI = 1.000, TLI = 1.039, SRMR = 0.058. A negative unstandardized path coefficient of  $-0.033$  ( $SE = 0.01$ ,  $p = .001$ ) from the intercept ( $I$ ) of perceived peer support to loneliness was obtained, indicating that lower levels of perceived peer support at T1 in 1996 predicted higher levels of loneliness at T4 in 2016. Also, a negative unstandardized coefficient path coefficient,  $-0.58$  ( $SE = 0.28$ ,  $p = .038$ ), from the rate of change ( $S$ ) of perceived peer support over time to loneliness at T4 was found, indicating that the faster perceived peer support decreased, the higher loneliness was at T4.

## 4. Discussion

Findings revealed that from adolescence to adulthood, parent and peer support decreased in importance during adolescence, after a peak in importance for perceived peer support in early adulthood. This is consistent with our first two hypotheses. Those adolescents who already started with relatively little peer support as well as those who experienced the most rapid decline in perceived peer support experienced most loneliness 20 years later, confirming the third hypothesis for perceived peer support but not for perceived parent support. These findings are in line with previous research on the development of the importance of social support figures and social support in typically developing young people (Cheng & Chan, 2004; Helsen et al., 2000; Rueger et al., 2016).

While the shape of the overall trajectory of perceived peer support in young people with a visual impairment may be similar to typically developing adolescents, it is also important to consider whether the timing of the peak in peer support may be different. In a study done by Helsen et al. (2000) among typically developing adolescents, a decline in the importance of peer support was found between age 16 and 18. Brown et al. (1986) found a decline in peer group affiliation before age 19. In our study a decline occurred after T2 when the participants had a mean age of 27 years. This confirms earlier research showing that young people with disabilities experience developmental delays in social functioning across the transition into adulthood (Hudson, 2003, 2006; Stewart et al., 2002, 2014). Therefore, although young people with a visual impairment experienced several social challenges, their social support trajectories followed a similar, but delayed, pattern as typically developing young people. Pinquart and Pfeiffer (2013) also found similarities in the trajectories of social support between visually impaired and typically developing young people, but due to the use of a smaller time window their study provided no insight into possible developmental delays in the course of social support.

The current study found only partial support for the hypothesis that initial levels and the trajectory of change of social support would predict loneliness in later life (hypothesis 3). For perceived peer support both the initial levels and the rate of change predicted loneliness. In contrast, no association was found between perceived parent support and feelings of loneliness during adulthood. The unexpected lack of association between perceived parent support and loneliness may be due to the measure of perceived social support failing to distinguish between types of support. Earlier studies have shown that especially emotional support contributed to psychological wellbeing and instrumental support can even have a detrimental effect (Merz & Considine, 2009). For young people with a visual impairment, instrumental or practical support from parents, such as material, financial, and mobility assistance, may dominate and reduce the positive effects of emotional support on psychological wellbeing. Furthermore, Shaw, Krause, Chatters, Connell, and Ingersoll-Dayton (2004) showed that psychosocial variables, such as self-esteem and personal control, explain a big part of the relationship between parental support and psychological wellbeing. This means that parental support that enhances self-esteem and personal control will also improve psychological wellbeing. It would be useful to further study the needs of adults with a visual impairment to which parents and other members of the social network may respond, to understand the impact that addressing these needs may have on self-esteem and personal control. The lack of association between perceived parent support and later loneliness found in this current study could also be explained by changes in relative importance of social support figures across the life course. Previous research showed that during adolescence, when peers take up a more central role in the support network, parent support becomes less effective in enhancing psychological wellbeing, relative to perceived peer support (Cantone et al., 2015; Kun, Stroeken, Tintelen, & Vreemant, 2013; Lee & Goldstein, 2016). For perceived peer support we did confirm the expected association with loneliness in later life. Both the initial levels and trajectory of change predicted loneliness, as predicted in hypothesis 3. This is in line with previous research showing that peer support, in particular, enhances psychological wellbeing in adolescence (Friedlander et al., 2007; Kef & Dekovic, 2004; Rueger et al., 2016). It shows that a person's ability to form close relationships, to gain acceptance from peers, and to maintain access to high levels of peer support during this life period was associated with risk of poor wellbeing. While transitioning into adulthood, people usually become more autonomous and less dependent on their parents. Decision-making



responsibilities shift from parent to child, and children may reject offers of parental support to create opportunities for showing autonomy. Peer support is relatively more acceptable because it is less likely to conflict with social role expectation in adulthood than is receiving support from parents. It may also be that the nature of the support from parents shifts from less dependence on practical support (e.g., financial, housing, mobility) to seeking parents' advice in negotiating the challenges of adults life (Guan & Fuligni, 2016). The differential associations between parental and peer support with loneliness in later life are in line with the notion that developmental antecedents and consequences of experience vary according to timing in someone's life (Elder, 1998).

#### 4.1. Implications for practice and society

Early onset loneliness has considerable personal and societal costs. Because both the trajectory of change and the initial level of support from peers were found related to loneliness in later life, rehabilitation and education practices might not only focus on establishing relationships with peers during adolescence, but also on how to maintain those relationships throughout adolescence and adulthood. Difficulties with social interactions, developmental delays, and low social competence could diminish the opportunities of young people with a visual impairment for keeping up relationships with close and important peers. In addition, young adults with visual disabilities may benefit from learning how to maintain a network of peer support, even when inevitably some peer relationships break down.

Both trajectories of perceived parent and peer support showed a decrease over time from emerging adulthood into adulthood. Although this trend converges with the trajectories of typically developing young people, a gap in support could occur for adults with a visual impairment. This decline in parent and peer support among typically developing people occurs as the life course takes a new turn when romantic partners become more salient as sources of support. Research among young people with a visual impairment showed that they struggle more with developing romantic relationships (Huurre & Aro, 1998; Kef & Bos, 2006) and that they tend to date less and have children at a later age. Keeping up high levels of social support from peers throughout adulthood or establishing relationships with other support figures, such as neighbors and family members, may therefore be needed to ensure sufficient access to support. Stimulating social integration of people with a visual impairment within society could be supported by creating inclusive educational settings, as interactions within these settings have been found to reduce negative attitudes towards people with a visual impairment (De Laat et al., 2013; MacMillan, Tarrant, Abraham, & Morris, 2014).

#### 4.2. Implications for research

As stated earlier, a preponderance of instrumental social support might diminish the positive effects of parent support on loneliness. Merz et al. (2009) showed that the negative impact of instrumental support on psychological wellbeing can be buffered by a high-quality relationship. Therefore, more research is needed on the quality of the relationship between parents and children with a visual impairment and its effect on the relationship between social support from parents and loneliness.

Moreover, this study found individual differences not only for initial levels but also rate of change over time of both perceived parent and peer support. This means that people with a visual impairment differed in their levels of support at the mean age of 18 (initial level) and that some people had a steeper decrease in perceived parent and peer support over time than others. Future research is needed to understand which factors predict these variations in levels, and rates of change, of support among young people with a visual impairment.

#### 4.3. Limitations

Current findings are based on self-reported data in a community based sample of young people with a visual impairment and may, therefore, lack generalizability. In addition, few participants in this study reported very low scores on social support as well as very high levels of loneliness. Also, over the 20 years, drop-out occurred at every measurement point, especially from T1 to T2 (36%). Drop-out rates decreased over time, due to the fact that technical applications, such as internet and social media, made it easier to reestablish and keep contact with the participants. Furthermore, drop-out rates were not related to levels of perceived social support.

Another limitation was that no data were gathered on actual levels of support provided by parents and peers. This study only assessed the importance of support figures for perceived social support regarding problems in several domains throughout life. No information is available about the actual frequency of support given by the different support figures. Research on the relation between perceived social support and actual levels of provided support from parents and peers may also be relevant to further inform recommendations for public policy and interventions.

Finally, loneliness was only included in the model for the final last wave in middle age, not in adolescence and early adulthood. This leaves open the possibility that dispositions related to loneliness might have existed during those earlier waves, having inadvertent effects on social relationships and perceived social support (Cacioppo & Hawkey, 2009). Longitudinal research that includes loneliness and various forms of social support at each measurement wave may shed more light on the plausibility of reverse causality from loneliness to decreasing social support.

#### 4.4. Conclusion

This study's major contribution concerned an extension of existing knowledge about social support among young people with a visual impairment using a unique longitudinal design. The results indicate that peer support is important to psychosocial wellbeing in

a way similar to people without visual disabilities. In contrast, no association of perceived social support from parents on loneliness in later life was found in this target group. More insight is needed in the nature of support parents provide to these young people and its implications for psychological wellbeing. The findings of this study underscore the relevance of efforts to foster and expand social networks of people with visual disabilities, not only in old age but also during the transition to adulthood.

### CRedit authorship contribution statement

**Eline C.M. Heppe:** Conceptualization, Methodology, Formal analysis, Investigation, Resources, Data curation, Writing - original draft. **Sabina Kef:** Conceptualization, Investigation, Resources, Data curation, Writing - review & editing, Supervision, Project administration, Funding acquisition. **Marleen H.M. de Moor:** Conceptualization, Methodology, Formal analysis, Data curation, Writing - review & editing, Supervision. **Carlo Schuengel:** Conceptualization, Resources, Data curation, Writing - review & editing, Supervision, Project administration, Funding acquisition.

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